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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/138,429 08/24/98 HASHIM

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EXAMINER

MERCADO, J

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 04/28/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

File Copy

Office Action Summary

Application No.
09/138,429

Applicant(s)
Hashim et al.

Examiner
Julian A Mercado

Group Art Unit
1745



☒ Responsive to communication(s) filed on Feb 22, 2000

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 1-20 is/are pending in the application

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to Applicant's amendment filed February 2, 2000.

The objection to the disclosure has been withdrawn in light of Applicant's amendment.

The objection to claim 16 under 37 CFR 1.75(c) has been withdrawn in light of Applicant's amendment.

The objection to claim 17 for minor informalities has been withdrawn.

The rejection of claims 2-5 under 35 U.S.C. 112, second paragraph has been withdrawn.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman (U.S. Pat. 5,380,414) in view of either Tepman (U.S. Pat. 5,527,438) or Katsuki (U.S. Pat. 5,728,276)

It is noted that the amendment to claim 1 has not changed the scope of protection sought. The ground of rejection based on Tepman '414 in view of either Tepman '438 or Katsuki is maintained for the reasons set forth in the previous Office Action.

Applicant submits that the magnetic field generated by the secondary magnetron is not substantially parallel at the surface of the substrate. However, as discussed in the previous Office

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Action the substrate support in Tepman's '414 invention employs a magnet array [11] disposed within the chamber and immediately positioned below the substrate surface. Although Tepman does not explicitly teach the magnetic field generated to be parallel, a specific disclosure is made to shape the plasma and flow of ions towards the substrate support (col. 4 line 61 *et seq*), and the examiner reasoned that because the magnetic array is disposed at equidistant ends of the substrate, the resulting magnetic field is considered to result in a substantially parallel plane due to conformity of the magnetic flux lines with the intervening substrate surface. A nonparallel magnetic field would in fact be ineffective in shaping the plasma and ion impingement to be uniformly distributed, i.e. flat across the substrate surface, thus it would be obvious to one of ordinary skill in the art that the magnetic array in Tepman's '414 invention generates a parallel magnetic field.

Applicant submits that the collimator in Tepman's '414 invention is not supported by the chamber wall but does submit that the collimator is positioned within the interior of the chamber. The positioning of the collimator within the interior of the chamber is the exact reasoning relied upon by the examiner as to why the collimator is inherently supported by the chamber wall. The collimator is a static structure within the interior of the chamber, thus it must be supported by appropriate flanges, attachment means and the like. The examiner also relied on Applicant's disclosure of the instant grounded collimator to be as described in Tepman's '438 Patent, as well as described in Katsuki '276 with both disclosures as evidence that collimators are conventionally grounded. Applicant's reasoning that the collimator in Tepman's 414 invention is

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not grounded is based on an apparent disclosure and illustration in Tepman '414 that the collimator is electrically floating, although Applicant has not provided columns and lines from Tepman '414 in support of this conclusion. Further, it appears to the examiner that Applicant may have confused the electrical bias to the shield with an electrical or floating bias to the collimator assembly.

Applicant submits that Tepman '438 does not teach, show or suggest a grounded collimator. However, Tepman '438 specifically discloses that the chamber wall is electrically grounded. (Col. 5 line 28) The collimator itself is specifically disclosed to be connected to the chamber wall by co-linear rods [70]. (Col. 7 line 22 *et seq*) The sputtered material is also disclosed to deposit, albeit undesirably, to the chamber wall and the collimator itself. (Col. 15 line 49 *et seq*) Thus, it is believed that the collimator has the same potential as the chamber wall, i.e. the collimator is grounded.

4. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman '414 in view of either Tepman '438 or Katsuki as discussed for claim 1 above, and further in view of Hsu (U.S. Pat. 5,589,039).

It is noted that the amendment to claims 1 and 2 have not changed the scope of protection sought. The ground of rejection based on Tepman '414 in view of either Tepman '438 or Katsuki and further in view of Hsu is maintained for the reasons set forth in the previous Office Action.

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Arguments against Hsu are directed towards Hsu's deficiency in teaching the use of a magnet structure with a grounded collimator to deposit a film of desired orientation. However, the primary and secondary references (namely, Tepman '414 and either Tepman '438 or Katsuki) are discussed above to teach or render obvious to one of ordinary skill in the art these limitations, in particular a grounded collimator. The teachings of Hsu were relied upon in the rejection to teach a target having a material that retains magnetic properties when deposited on the surface of the substrate. Further, it is noted that Hsu additionally teaches a parallel magnetic field across the substrate surface.

5. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman '414 in view of either Tepman '438 or Katsuki and further in view of Hsu as discussed for claims 1 and 2 above, and further in view of Boys *et al* (U.S. Pat. 4,500,409) and Applicant's admitted prior art.

It is noted that the amendment to claims 3-5 have not changed the scope of protection sought. The ground of rejection based on Tepman '414 in view of either Tepman '438 or Katsuki, further in view of Hsu and further in view of Boys *et al* is maintained for the reasons set forth in the previous Office Action.

Arguments against Boys are directed towards Boys' deficiency in teaching a substantially parallel magnetic field at the surface of the substrate support. However, the prior art combination is considered to render obvious the instant limitation. Specifically, Tepman '414 is considered to

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teach a magnet array which would result in a parallel magnetic field, and Hsu is considered to teach that a parallel magnetic field is desired in order to orient the deposited magnetic film.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Boys *et al.*

It is noted that the amendment to claim 6 has not changed the scope of protection sought. The ground of rejection based on Hsu in view of Boys *et al* is maintained for the reasons set forth in the previous Office Action.

Applicant submits that Boys does not teach a forming a parallel magnetic field. However, the combination of Hsu in view of Boys is considered to teach such a limitation and render a modification of Hsu obvious to one of ordinary skill in the art for reasons such as enhanced deposition rate and uniformity. Boys was relied upon solely to show that the instant long throw distance of at least 50 mm would be an obvious modification for the above reasons. As Boys teaches this limitation the rejection is maintained for the reasons set forth in the previous Office Action.

7. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Boys *et al* as discussed for claim 6 above, and further in view of Alex (U.S. Pat. 5,616,218) and either Tepman '438 or Katsuki.

It is noted that the amendment to claims 7 and 8 have not changed the scope of protection sought. The ground of rejection based on Hsu in view of Boys *et al*, Alex and either Tepman '438 or Katsuki is maintained for the reasons set forth in the previous Office Action.

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In response to this prior art combination, Applicant directs arguments against Alex in being deficient in teaching a grounded collimator. For similar reasons discussed above, however, the collimator in Alex's invention is considered to be grounded in that it is requisitely supported by the chamber wall which is itself grounded. Similar to Applicant's invention, therefore, the collimator in Alex's invention and the chamber wall are electrically connected and therefore share a common grounded bias.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Boys *et al.*

It is noted that the amendment to claim 9 has not changed the scope of protection sought. The ground of rejection based on Hsu in view of Boys *et al* is maintained for the reasons set forth in the previous Office Action.

Applicant's argument against the teachings of Hsu in view of Boys appears to be a piecemeal analysis of the individual references, and not a consideration of the combination of these references in rendering obvious the instant invention. The rejection is maintained to render obvious to one of ordinary skill in the art a modification of Hsu to employ the instant chamber pressure and the instant long throw distance for reasons such as enhanced sputtering and deposition uniformity.

9. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Boys *et al* as discussed for claim 9 above, and further in view of Alex, Applicant's admitted prior art, and either Tepman '438 or Katsuki.

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It is noted that the amendment to claims 10-14 has not changed the scope of protection sought. The ground of rejection based on Hsu in view of Boys *et al* and further in view of Alex, Applicant's admitted prior art and either Tepman '438 or Katsuki is maintained for the reasons set forth in the previous Office Action.

Applicant specifically argues against the references relied upon in the prior art combination to be absent of teaching or suggesting a grounded collimator. For similar reasons discussed above, however, a collimator such as taught in Alex's invention is considered to be grounded in that it is requisitely supported by the chamber wall which is itself grounded, and therefore, the collimator and the chamber wall are electrically connected by way of a common grounded bias.

10. Claim 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alex in view of Boys *et al*, Hsu, Applicant's admitted prior art, and either Tepman '438 or Katsuki.

It is noted that the amendment to claims 15-20 have not changed the scope of protection sought. The ground of rejection based on Alex in view of Boys *et al*, Hsu, Applicant's admitted prior art, and either Tepman '438 or Katsuki are maintained for the reasons set forth in the previous Office Action.

Applicant's arguments regarding the rejection of claims 15-20 reiterate the arguments addressed above. The rejection is similarly maintained for the reasons discussed above and in the previous Office Action.

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Conclusion

11. The prior art relied upon in this Office Action will not be provided since it is the same prior art made of record in the previous Office Action.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian A. Mercado whose telephone number is (703) 305-0511 . The examiner can normally be reached on Monday through Thursday from 8:30 AM to 6:00 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Maria Nuzzolillo, can be reached on (703) 305-3776. The official fax phone number

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for the organization where this application or proceeding is assigned is (703) 305-3599. The unofficial fax number is (703) 306-3429.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

 Jam/April 25, 2000

Maria Nuzzoillo
Supervisory Patent Examiner
Technology Center 1700

